IPD96D1 Relay - Software Versions (1.22)
IPR96D1 - MODBUS MEMORY MAP

| Add (Hex) | $\begin{aligned} & \hline \text { MODBUS } \\ & \text { REG. ADD } \\ & \text { (Dec) } \end{aligned}$ | Size | Description | Unit | Min | Step 1 | Level 1 | Step 2 | Level 2 | Step 3 | Max | Initial Value | Format | Associated Command | Read/ Write |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0000 | 300001 | 1 W | Product Code | --- | --- | --- | --- | --- | --- | --- | --- | 72 | 2 |  | R |
| 0001 | 300002 | 1 W | Product Model | --- | --- | --- | --- | --- | --- | --- | --- | 1 | 2 |  | R |
| 0002 | 300003 | 1 W | Version Number | --- | --- | --- | --- | --- | --- | --- | --- | 1,22 | 6 |  | R |
| 0003 | 300004 | 1 W | Product Language | --- | --- | --- | --- | --- | --- | --- | --- | 1 | 2 |  | R |
| 0004 | 300005 | 124 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0080 | 400129 | 1 W | Command Operation Code | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1200 |  | w |
| 0081 | 400130 | 1 W | Command Password | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2 |  | w |
| 0082 | 300131 | 14 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0090 | 400145 | 2 W | Date \& Time Preset Data | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6408 | 5 | R/W |
| 0092 | 400147 | 10 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 009C | 400157 | 1 W | Access Code Preset | --- | 1111 | 1 | --- | --- | --- | --- | 9999 | --- | 10 | 13 | R/W |
| 009D | 400158 | 32 W | Reserved |  |  |  |  |  |  |  | --- |  |  |  |  |
| 00BD | 400190 | 8 W | BLE Device Name Preset | --- | --- | --- | --- | --- | --- | --- | --- | --- | 6410 | 4 | R/W |
| 00 C 5 | 400198 | 59 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0100 | 400257 | 1 W | Display Contrast | --- | 1 | 1 | --- | --- | --- | --- | 10 | 5 | 2 |  | R/W |
| 0101 | 400258 | 1 W | Display Brightness | --- | 0 | 1 | --- | --- | --- | --- | 10 | 5 | 2 |  | R/W |
| 0102 | 400259 | 1 W | System Frequency | Hz | 0 | 1 | --- | --- | --- | --- | 1 | 0 | 6401 |  | R/W |
| 0103 | 400260 | 1 W | Ground CT Primary | A | 5 | 5 | --- | --- | --- | --- | 5000 | 50 | 2 |  | R/W |
| 0104 | 400261 | 1 W | Command | --- | 0 | 1 | --- | --- | --- | --- | 3 | 1 | 7041 |  | R/W |
| 0105 | 400262 | 1 W | Out Of Service Relay | --- | 0 | 1 | --- | --- | --- | --- | 1 | 0 | 7012 |  | R/W |
| 0106 | 400263 | 1 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0107 | 400264 | 1 W | Max Switching Current Config | --- | 0 | 1 | --- | --- | --- | --- | 1 | 1 | 6407 |  | R/W |
| 0108 | 400265 | 1 W | Max Switching Current | A | 50 | 10 | --- | --- | --- | --- | 5000 | 400 | 2 |  | R/W |
| 0109 | 400266 | 13 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0116 | 400279 | 1 W | Trip Relay Mode | --- | 0 | 1 | --- | --- | --- | --- | 1 | 0 | 902 |  | R/W |
| 0117 | 400280 | 1 W | Aux1 Relay Mode | --- | 0 | 1 | --- | --- | --- | --- | 1 | 0 | 902 |  | R/W |
| 0118 | 400281 | 1 W | Aux2 Relay Mode | --- | 0 | 1 | --- | --- | --- | --- | 1 | 0 | 902 |  | R/W |
| 0119 | 400282 | 6 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 011F | 400288 | 1 W | Trip Relay Pulse Time | ms | 100 | 100 | --- | --- | --- | --- | 2000 | 200 | 2 |  | R/W |
| 0120 | 400289 | 1 W | Aux1 Relay Pulse Time | ms | 100 | 100 | --- | --- | --- | --- | 2000 | 200 | 2 |  | R/W |
| 0121 | 400290 | 1 W | Aux2 Relay Pulse Time | ms | 100 | 100 | --- | --- | --- | --- | 2000 | 200 | 2 |  | R/W |
| 0122 | 400291 | 10 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 012C | 400301 | 1 W | Digital Input 1 Function | --- | 0 | 1 | --- | --- | --- | --- | 5 | 2 | 1230 |  | R/W |
| 012D | 400302 | 1 W | Digital Input 2 Function | --- | 0 | 1 | --- | --- | --- | --- | 5 | 1 | 1230 |  | R/W |
| 012E | 400303 | 13 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 013B | 400316 | 1 W | Ground Timed OverCurrent1 Relays | --- | 0 | 1 | --- | --- | --- | --- | 7 | 0 | 1216 |  | R/W |
| 013C | 400317 | 1 W | Ground Timed OverCurrent1 Pickup | \% | 1 | 1 | --- | --- | --- | --- | 300 | 12 | 2 |  | R/W |
| 013D | 400318 | 1 W | Ground Timed OverCurrent1 Curve | --- | 0 | 1 | --- | --- | --- | --- | 12 | 1 | 6016 |  | R/W |
| 013E | 400319 | 1 W | Ground Timed OverCurrent1 Curve Multiplier | --- | 0.1 | 0.1 | --- | --- | --- | --- | 20.0 | 1 | 4 |  | R/W |
| 013F | 400320 | 1 W | Ground Timed OverCurrent1 Delay | s | 0,1 | 0.01 | 1 | 0.1 | 100 | 1 | 600 | 1 | 6 |  | R/W |
| 0140 | 400321 | 20 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0154 | 400341 | 1 W | Ground Timed OverCurrent2 Relays | --- | 0 | 1 | --- | -- | --- | --- | 7 | 0 | 1216 |  | R/W |
| 0155 | 400342 | 1 W | Ground Timed OverCurrent2 Pickup | \% | 1 | 1 | --- | --- | --- | --- | 300 | 12 | 2 |  | R/W |
| 0156 | 400343 | 1 W | Ground Timed OverCurrent2 Curve | --- | 0 | 1 | --- | --- | --- | --- | 12 | 1 | 6016 |  | R/W |
| 0157 | 400344 | 1 W | Ground Timed OverCurrent2 Curve Multiplier | --- | 0.1 | 0.1 | --- | --- | --- | --- | 20.0 | 1 | 4 |  | R/W |
| 0158 | 400345 | 1 W | Ground Timed OverCurrent2 Delay | s | 0,1 | 0.01 | 1 | 0.1 | 100 | 1 | 600 | 1 | 6 |  | R/W |
| 0159 | 400346 | 20 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 016D | 400366 | 1 W | Ground Inst. OverCurrent Relays | --- | 0 | 1 | --- | --- | --- | --- | 7 | 0 | 1216 |  | R/W |
| 016E | 400367 | 1 W | Ground Inst. OverCurrent Pickup | \%CT | 1 | 1 | 10 | 10 | --- | --- | 2000 | 120 | 2 |  | R/W |
| 016F | 400368 | 1 W | Ground Inst. OverCurrent Delay | ms | 0 | 10 | --- | --- | --- | --- | 2000 | 0 | 2 |  | R/W |
| 0170 | 400369 | 20 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0184 | 400389 | 1 W | Breaker Failure Relays | -- | 0 | 1 | --- | -- | --- | --- | 7 | 0 | 1216 |  | R/W |
| 0185 | 400390 | 1 W | Breaker Failure Delay | ms | 10 | 10 | --- | --- | --- | --- | 2500 | 1000 | 2 |  | R/W |
| 0186 | 400391 | 5W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 018B | 400396 | 1 W | Mechanical Operations Relays | --- | 0 | 1 | --- | --- | --- | --- | 7 | 0 | 1216 |  | R/W |
| 018C | 400397 | 1 W | Mechanical Operations Maximum | --- | 5 | 5 | --- | --- | --- | --- | 9995 | 3000 | 2 |  | R/W |
| 018D | 400398 | 10 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |
| 0197 | 400408 | 1 W | System Events Config | --- | 0 | 1 | --- | --- | --- | --- | 1 | 1 | 6407 |  | R/W |
| 0198 | 400409 | 1 W | Output Events Config | --- | 0 | 1 | --- | --- | --- | --- | 1 | 1 | 6407 |  | R/W |
| 0199 | 400410 | 1 W | Digital Input Events Config | --- | 0 | 1 | --- | --- | --- | --- | 1 | 1 | 6407 |  | R/W |
| 019A | 400411 | 1 W | Gnd Current Protec. Events Config | --- | 0 | 1 | --- | --- | --- | --- | 1 | 1 | 6407 |  | R/W |
| 019B | 400412 | 5 W | Reserved |  |  |  |  |  |  |  |  |  |  |  |  |



| IPR96D1 DATA FORMATS |  |  |  |
| :---: | :---: | :---: | :---: |
| Format Code | Type | Value | Definition |
| F1 | Integer |  | Signed Integer Value |
|  |  |  | Example: -123 saved as -123 |
|  |  |  |  |
| F2 | Integer |  | Unsigned Integer Value |
|  |  |  | Example: 123 saved as 123 |
|  |  |  |  |
| F4 | Integer |  | Unsigned Integer Value with 1 decimals |
|  |  |  | Example: 1.0 saved as 10 |
|  |  |  |  |
| F5 | Integer |  | Signed Integer Value with 2 decimals |
|  |  |  | Example: -1.00 saved as -100 |
|  |  |  |  |
| F6 | Integer |  | Unsigned Integer Value with 2 decimals |
|  |  |  | Example: 1.00 saved as 100 |
|  |  |  |  |
| F10 | Integer |  | Unsigned Integer Access Code Value Register Format |
|  |  |  | Example: 1111 saved as 1111 (only digits 1~9 accepted, digit 0 is NOT ALLOWED) |
| F902 | Integer |  | Relay Mode |
|  |  | 0 | LATCHED |
|  |  | 1 | PULSED |
| F1211 | 16 Bits BitMap |  | Output Relays Status Register |
|  |  | Bit 0 | Trip Output Relay \{ 0 = "De-energized" , 1 = "Energized" \} |
|  |  | Bit 1 | Aux1 Output Relay $\{0=$ "De-energized" , 1 = "Energized" $\}$ |
|  |  | Bit 2 | Aux2 Output Relay \{ 0 = "De-energized" , 1 = "Energized" $\}$ |
|  |  | Bit 3 ~ Bit 15 | Not Used |
| F1216 | Integer |  | Output Relays |
|  |  | 0 | --- |
|  |  | 1 | T-- |
|  |  | 2 | -1- |
|  |  | 3 | T1- |
|  |  | 4 | --2 |
|  |  | 5 | T-2 |
|  |  | 6 | -12 |
|  |  | 7 | T12 |
| F1230 | Integer |  | Digital Input Function |
|  |  | 0 | NONE |
|  |  | 1 | BREAKER STATUS |
|  |  | 2 | EXTERNAL RESET |
|  |  | 3 | ACTIVATE AUX1 |
|  |  | 4 | ACTIVATE AUX2 |
| F6016 | Integer |  | Digital Protection Curve Definition Format Configuration Register Format |
|  |  | 0 | DefiniteTime |
|  |  | 1 | ANSI Moderate Inverse |
|  |  | 2 | ANSI Normal Inverse |
|  |  | 3 | ANSI Very Inverse |
|  |  | 4 | ANSI Extreme Inverse |
|  |  | 5 | IAC Moderate Inverse |
|  |  | 6 | IAC Normal Inverse |
|  |  | 7 | IAC Very Inverse |
|  |  | 8 | IAC Extreme Inverse |
|  |  | 9 | IEC Short Time |
|  |  | 10 | IEC A Normal Inverse |
|  |  | 11 | IEC B Very Inverse |
|  |  | 12 | IEC C Extreme Inverse |
| F6020 | 16 Bits BitMap |  | IPR96D1 Digital Input Status |
|  |  | Bit 0 | Digital Input 1 \{ $0=$ "Deactivated" , 1 = "Activated" $\}$ |
|  |  | Bit 1 | Digital Input 2 \{ $0=$ "Deactivated" , 1 = "Activated" $\}$ |
|  |  | Bit $2 \sim$ Bit 15 | Not Used |
| F6022 | 32 Bits BitMap |  | IPR96D1 Pickup Flag Format |
|  |  | Bit 0 | Gnd Instant Overcurrent |
|  |  | Bit 1 | Gnd Timed1 Overcurrent |
|  |  | Bit 2 | Gnd Timed2 Overcurrent |
|  |  | Bit 3 | Breaker Failure |
|  |  | Bit 4 | Mechanical Operation |
|  |  | Bit 5 ~ Bit 31 | Not Used |
| F6023 | 32 Bits BitMap |  | IPR96D1 Status Flag Format |
|  |  | Bit 0 | Gnd Instant Overcurrent |
|  |  | Bit 1 | Gnd Timed1 Overcurrent |
|  |  | Bit 2 | Gnd Timed2 Overcurrent |
|  |  | Bit 3 | Breaker Failure |
|  |  | Bit 4 | Mechanical Operation |
|  |  | Bit $5 \sim$ Bit 12 | Not Used |
|  |  | Bit 13 | Setpoint Discrepancy |
|  |  | Bit 14 | Flash Busy |
|  |  | Bit 15 | ADC Failure |


|  |  | Bit 16 | BLE Failure |
| :---: | :---: | :---: | :---: |
|  |  | Bit 17 | RAM Failure |
|  |  | Bit 18 | Check Events |
|  |  | Bit 19 | Max Switching Current |
|  |  | Bit 20 | Out of Service |
|  |  | Bit 21 ~ Bit 31 | Not Used |
| F6040 | 16 Bits BitMap |  | IPR96D1 Led Status |
|  |  | Bit 0 | Status Led \{ 0 = "Off" , 1 = "On" \} |
|  |  | Bit 1 | Trip Led \{ 0 = "Off" , 1 = "On" \} |
|  |  | Bit 2 ~ Bit 15 | Not Used |
| F6401 | Integer |  | System Frequency |
|  |  | 0 | 50 Hz |
|  |  | 1 | 60 Hz |
| F6407 | Integer |  | Events Enable/Disable |
|  |  | 0 | Disable |
|  |  | 1 | Enable |
| F6408 | Integer |  | Unix Timestamp |
|  |  |  | This count starts at the Unix Epoch on January 1st, 1970 at UTC |
| F6409 | String |  | BaudRate Value |
|  |  | 3 | 9600 Bps |
|  |  | 4 | 19200 Bps |
|  |  | 5 | 38400 Bps |
|  |  | 6 | 57600 Bps |
|  |  | 7 | 115200 Bps |
| F6410 | String |  | String |
|  |  | BLE Name | Allowed characters: \&()-./0123456789:ABCDEFGHIJKLMNOPQRSTUVWXYZ[l]_abcdefghijklmnopqrstuvwxyz |
| F6414 | Integer |  | RS Port Configuration |
|  |  | 2 | 8N1 (8 bits Data, Parity NONE, 1 bit Stop) |
|  |  | 3 | 8N2 (8 bits Data, Parity NONE, 2 bit Stop) |
|  |  | 4 | 8 E 1 (8 bits Data, Parity EVEN, 1 bit Stop) |
|  |  | 5 | 8E2 (8 bits Data, Parity EVEN, 2 bit Stop) |
|  |  | 6 | 8 O 1 (8 bits Data, Parity ODD, 1 bit Stop) |
|  |  | 7 | 8 O 2 (8 bits Data, Parity ODD, 1 bit Stop) |
| F6619 | 16 Bits BitMap |  | Button Status |
|  |  | Bit 0 | Down \{ 0 = "Not Pressed" , 1 = "Pressed" $\}$ |
|  |  | Bit 1 | Up \{ 0 = "Not Pressed" , 1 = "Pressed" $\}$ |
|  |  | Bit 2 | Function \{ 0 = "Not Pressed" , 1 = "Pressed" $\}$ |
|  |  | Bit 3 | Enter \{ 0 = "Not Pressed" , 1 = "Pressed" $\}$ |
|  |  | Bit 4 | Esc \{ 0 = "Not Pressed" , 1 = "Pressed" \} |
|  |  | Bit 5 ~ Bit 15 | Not Used |
| F7012 | Integer |  | IPR96D1 Out of Service Relay |
|  |  | 0 | NONE |
|  |  | 1 | AUX2 |
| F7041 | Integer |  | Modbus Command |
|  |  | 0 | LOCAL |
|  |  | 1 | REMOTE 485 |
|  |  | 2 | REMOTE BLE |
|  |  | 3 | REMOTE 485 + BLE |


| IPR96D1 COMMANDS <br> (F1200) |  |  |  |
| :---: | :---: | :---: | :---: |
| Command | Label | Password | Preset data |
| 0 | No command | no |  |
| 1 | Remote Reset | Adv |  |
| 4 | Set BLE Name | Adv | x |
| 5 | Set Date and Time | user | x |
| 9 | Clear Events | user |  |
| 10 | Operate Aux1 | Adv |  |
| 11 | Operate Aux2 | Adv |  |
| 13 | Set Access Code | user | x |
| 29 | Clear Maintenance Data | Adv |  |


| IPR96D1 EVENTS(F1215) |  |  |
| :---: | :---: | :---: |
| Category | Event | Code |
| NO_CATEGORY | Events Clear | 1 |
| GND_CURRENT_PROT | Gnd Inst Overcurrent | 2 |
| GND_CURRENT_PROT | Gnd Timed1 Overcurrent | 3 |
| GND_CURRENT_PROT | Gnd Timed2 Overcurrent | 4 |
| SYSTEM | Breaker Failure | 5 |
| SYSTEM | Mechanical Operation | 6 |
| DIGITAL_INPUT | Digital Input 1 Deactive | 7 |
| DIGITAL_INPUT | Digital Input 1 Active | 8 |
| DIGITAL_INPUT | Digital Input 2 Deactive | 9 |
| DIGITAL_INPUT | Digital Input 2 Active | 10 |
| DIGITAL_INPUT | --- | 11 |
| DIGITAL_INPUT | --- | 12 |
| DIGITAL_INPUT | Breaker Status Opened | 13 |
| DIGITAL_INPUT | Breaker Status Closed | 14 |
| DIGITAL_INPUT | Remote Reset | 15 |
| DIGITAL_INPUT | Remote Trip Set | 16 |
| OUTPUT_RELAY | Trip De-Energized | 17 |
| OUTPUT_RELAY | Aux1 De-Energized | 18 |
| OUTPUT_RELAY | Aux2 De-Energized | 19 |
| OUTPUT_RELAY | Trip Energized | 20 |
| OUTPUT_RELAY | Aux1 Energized | 21 |
| OUTPUT_RELAY | Aux2 Energized | 22 |
| OUTPUT_RELAY | Trip Remote De-Energized | 23 |
| OUTPUT_RELAY | Aux1 Remote De-Energized | 24 |
| OUTPUT_RELAY | Aux2 Remote De-Energized | 25 |
| OUTPUT_RELAY | Trip Remote Energized | 26 |
| OUTPUT_RELAY | Aux1 Remote Energized | 27 |
| OUTPUT_RELAY | Aux2 Remote Energized | 28 |
| SYSTEM | Default Setpoint | 29 |
| SYSTEM | Setpoint Stored | 30 |
| SYSTEM | Setpoint Discrepancy | 31 |
| SYSTEM | Password Changed | 32 |
| SYSTEM | Model Changed | 33 |
| SYSTEM | Test BLE | 34 |
| SYSTEM | Trip Data Lost | 35 |
| SYSTEM | Trip Data Restored | 36 |
| SYSTEM | Calibration Time Data Lost | 37 |
| SYSTEM | Calibration Data Lost | 38 |
| SYSTEM | Power Loss | 39 |
| SYSTEM | Aux Power Restored | 40 |
| SYSTEM | Maintenance Data Cleared | 41 |
| SYSTEM | Maintenance Data Lost | 42 |
| SYSTEM | Maintenance Data Restored | 43 |
| SYSTEM | Status Lost | 44 |
| SYSTEM | BLE Failure | 45 |
| SYSTEM | ADC Failure | 46 |
| SYSTEM | Flash Busy | 47 |
| SYSTEM | Out of Service | 48 |
| SYSTEM | Max Switch Current | 49 |

